# CHAPTER IV
# PROBLEMS AND OPPORTUNITIES

This chapter describes major identified water resource problems and related opportunities in the study area based on the existing and likely future conditions described in **Chapter III**. The discussion is divided into sections on reliability and quality, and related opportunities.

## RELIABILITY AND QUALITY OF WATER RESOURCES

The primary water resource problems in the study area are water supply reliability and quality. The discussion below begins with a general overview of water resource problems in California, and then describes problems and opportunities specific to the LVE study area.

### Current and Future Water Shortages

Today, significant challenges exist for urban, agricultural, and environmental water users in California. Competition for finite water resources often leads to shortages. With finite opportunities to develop new water sources, California faces increasing water supply shortages in the future, particularly during dry years, as the State's population continues to rise. In the study area, a trend exists of increasing shortages through 2020 and further into the future. **Table IV-1** compares demands and supplies under drought year conditions for 2000 and 2020, based on the 1998 California Water Plan (Bulletin 160-98). For comparison purposes, the 6.2-million acre-foot (MAF) shortage projected in 2020 in the table below is roughly equal to the total current CVP agricultural water delivery capacity of about 7 MAF. As mentioned in **Chapter II**, an update of the Water Plan is currently underway, and when finalized, relevant information on future water demands and supplies will be included in future studies for the LVE.

However, the magnitude of future shortages throughout the state of California may be even greater than indicated in **Table IV-1** due to the difficulty in forecasting future conditions. For example, if applied water for agricultural uses does not decline in the future, as shown above, this water would not be available to meet M&I needs, and projected shortages would increase. Similarly, the ongoing drought in the Colorado River basin, and reductions in supplies associated with the Quantification Settlement Agreement, may not be adequately reflected in the projections. Further, it is anticipated that the amount of water dedicated to environmental purposes will increase in the future in response to continued environmental restoration efforts in the Central Valley. Finally, **Table IV-1** does not consider the effect of increasing statewide water shortages on the water transfer market, on which many agencies rely to meet demands in dry years.

**TABLE IV-1**
**COMPARISON OF EXISTING AND FUTURE CALIFORNIA WATER USE VERSUS SUPPLIES UNDER DROUGHT YEAR CONDITIONS**

| Item | 2000 | 2020 |
|---|---|---|
| **Population** (millions) | **35** | **46** |
| **Water Demand** (million acre-feet) | | |
| Urban | 9.7 | 12.4 |
| Agricultural | 34.1 | 32.3 |
| Environmental | 21.2 | 21.3 |
| ***Total*** | ***65.0*** | ***66.0*** |
| **Water Supply** (million acre-feet) | | |
| Surface Water | 43.5 | 43.3 |
| Ground Water | 15.8 | 16.0 |
| Recycled/Desalinated | 0.3 | 0.4 |
| ***Total*** | ***59.7*** | ***59.8*** |
| **SHORTAGE** (million acre-feet) | **5.4** | **6.2** |

*Source: 1998 California Water Plan (Bulletin 160-98)*

*Notes: Drought years reflect successions of dry and critically dry years. Current modeling identified drought period delivery as the average quantity for the combination of the periods of May 1928-October 1934; October 1975-Septebmer 1977; and June 1986-September 1992. Water year determination is made by Reclamation and DWR according to hydrologic region (Sacramento River Valley or San Joaquin River Valley) and service area. The year type determination of wet, above normal, below normal, dry, or critical is based on storage, runoff, and previous year classification.*

Water supply reliability in the LVE study area is strongly linked to statewide water supply problems and shortages. Many Bay Area water agencies rely on CVP and/or SWP Delta contract deliveries to meet a large portion of their demands. Many factors influence the amount of water available from CVP and SWP for delivery to water users, including hydrology, the amount of water in storage, and facility and conveyance losses. In any given year, user allocations are based on available supplies and contractor requests, with the most significant supply reductions occurring in dry and critically dry years. Bay Area water agencies look to local supplies to meet demands within their service areas when CVP and SWP allocations are reduced. However, local dry periods often coincide with periods when imported CVP and SWP supplies also are reduced, and opportunities are limited to develop new local supplies.

Although contractors may be allocated less water than they request during dry years, their CVP and SWP allocations often are greater than these agencies request during wet years. Some Bay Area water agencies are unable to take advantage of higher wet year allocations because they lack local facilities to store the excess water for use in dry years. To meet this challenge, all three SBA contractors have entered into agreements with the Semitropic Groundwater Banking and Exchange Program (GBEP) to store excess SWP allocations during wet years, enabling them to take water from storage during dry and critical dry years. In the future, however, this program may not be sufficient to meet the needs of Bay Area Water agencies during dry and critically dry periods.

**Table IV-2** summarizes current and anticipated 2020 water balances for ACWD, CCWD, SCVWD, and Zone 7 water agencies under two conditions: with existing supplies only, and with both existing and anticipated future supplies. Although a water balance is not available for all districts, the table indicates that the region could experience growing water shortages during drought periods in the next 15 years, even if planned future supplies can be developed and/or acquired as outlined in current local water management plans (such as increased conservation, demand management, desalinization, and future water transfer agreements). Beyond 2020, shortages are expected to become more severe as the population in both the Bay Area and California continues to grow.

**TABLE IV-2**
**COMPARISON OF EXISTING & FUTURE (2020) WATER DEMANDS VERSUS SUPPLIES IN THE STUDY AREA UNDER DROUGHT PERIOD CONDITIONS**

| Item | ACWD | | CCWD | | SCVWD | | Zone 7 | |
|---|---|---|---|---|---|---|---|---|
| | 2000 | 2020 | 2000 | 2020 | 2000 | 2020 | 2000 | 2020 |
| **Existing & Likely Future Supplies & Demand Reductions (1,000 acre-feet/year)** | | | | | | | | |
| **Demand** (less conservation) | 66.3 | 72.7 | 172.0 | 206.0 | 420.0 | 451.1 | 63.6 | 78.9 |
| **Supply** | *75.1* | *75.1* | *140.1* | *140.1* | *N/A*[2] | *N/A*[2] | *63.6* | *73.9* |
| **Balance**[3] | **8.8** | **2.4** | **-31.9** | **-65.9** | **N/A** | **N/A** | **0** | **-5.0** |
| **Existing & Planned[4] Future Supplies & Demand Reductions (1,000 acre-feet/year)** | | | | | | | | |
| **Demand** (less conservation) | 66.3 | 70.6 | 172.0 | 200.7 | 420.0 | 435.4 | 63.6 | 74.8 |
| **Supply** | *75.1* | *82.9* | *140.1* | *157.8* | *N/A*[2] | *N/A*[2] | *63.6* | *74.8* |
| **Balance**[3] | **8.8** | **12.3** | **-31.9** | **-42.9** | **N/A** | **N/A** | **0** | **0** |

KEY: ACWD = Alameda County Water District; CCWD = Contra Costa Water District; N/A = not available; SCVWD = Santa Clara Valley Water District; Zone 7 = Alameda County Flood Control and Water Conservation District, Zone 7

*Notes:*

1. *Refer to Chapter III, Tables III-9, III-10, III-18, and III-19, for details regarding the sources and assumptions used for the supplies and demands presented for each agency.*
2. *Groundwater use, an important part of SCVWD's local supplies, can not be quantified at this time. Consequently, a water balance is not presented for SCVWD.*
3. *A negative water balance value indicates a potential water shortage.*
4. *Planned supplies include potential water sources identified in an agency's Urban Water Management Plan but not yet secured or developed.*
5. *Critical drought period: Water Years 1987-1992.*

*Source: District Urban Water Management Plans. See Chapter III for further breakdown.*

For comparison, **Figure IV-1** illustrates potential future drought-year shortages in the region based solely on population growth projections in Alameda, Santa Clara, and Contra Costa counties. Population growth in the region corroborates the trend of increasing shortages shown in the previous table, and indicates that shortages are likely to continue to increase beyond 2020 if new supplies are not developed. Please note that water agency service areas and county boundaries in the study area differ; because the values in **Figure IV-1** are based on total

estimated county population growth (rather than projected demand in each water district), these values differ from the values in **Table IV-2**. However, **Figure IV-1** is included to further illustrate the trend toward increasing water shortages beyond 2020.

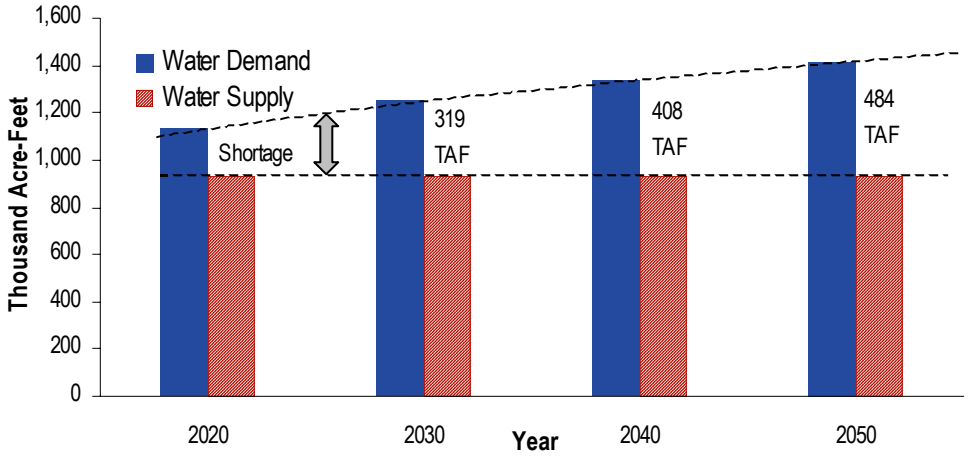


**FIGURE IV-1 - PROJECTED DRY YEAR WATER SUPPLY SHORTAGES BEYOND 2020 BASED ON COUNTY POPULATION GROWTH IN ALAMEDA, SANTA CLARA, AND CONTRA COSTA COUNTIES**

During recent droughts, Bay Area water agencies have experienced substantial cutbacks in water supply. Aggressive conservation programs, storage in local reservoirs and groundwater basins, and water transfers have helped these agencies manage water supplies and minimize the severity of rationing for their customers during dry years. Local water management plans also have been developed to guide how Bay Area water agencies will meet future water demands through 2020. However, as demands both within and outside the study area increase, shortages in dry and critically dry years will increase, and may even occur during average years. Further, competition for the State's finite water supplies in the midst of future shortages will also affect the ability of Bay Area water providers to acquire water on the open market to supplement their local and contract supplies. *An increasing need remains to improve dry-year water supply reliability for Bay Area providers and the State as a whole, particularly into the future beyond 2020.*

## Water Quality

Although State water quality standards have been maintained, the quality of water supplies in the study area has generally declined over the past century due to saline intrusion resulting from water resources development; polluted runoff from urban, agricultural, and other development; and changes to the physical environment. Because Bay Area water agencies typically blend water from various sources to attain a desired quality, water quality in the study area is a function of both water source and volume. Providers in the study area use imported supplies from the Delta and local groundwater and surface water supplies. The ratio of local to imported supplies in any given year, and effectiveness of blending, depends upon CVP and SWP allocations, the quality of supplies drawn from the Delta, and the availability of local supplies.

Delta supplies, which provide a significant portion of the region's water, are subject to considerable seasonal and geographic variations in water quality due to hydrology, the Delta inflow/outflow ratio, water temperature, seawater intrusion, and numerous other factors. Seasonally high salinity, bromide, and organic carbon concentrations found in water delivered to the Bay Area, particularly in the late summer and fall, can increase the cost of treatment, cause water to taste bad, and reduce the life of household appliances. High levels of bromide can also react with disinfectants used in conventional treatment processes to produce harmful by-products that pose a human health hazard. Imported water of poor quality also reduces the effectiveness of blending and limits the beneficial uses of the water for groundwater recharge and other purposes. Agencies without the ability to accept and store Delta water deliveries in excess of their immediate needs can not take advantage of periods of higher water quality in the Delta; they must take deliveries coincident with demands, regardless of quality.

While local water supplies do not experience the wide seasonal variation in quality of Delta supplies, seawater intrusion into groundwater basins and urban and rural pollutants can be problematic. Local supplies are relied on heavily during dry and critically dry years when both the quantity and quality of Delta project supplies are reduced. Furthermore, water imported from the Delta represents a key resource for local groundwater recharge and management programs.

Various projects and programs have been implemented to improve the quality of Bay Area water supplies. Delta water quality is monitored and regulated, groundwater is managed more effectively, treatment plants have been constructed, and projects such as the Los Vaqueros Project, which provides access to higher quality winter water, have been implemented. However, seasonal degradation of Delta water quality will likely continue into the future as rising demands for water in the Central Valley exert pressure on the Delta system. As substitute supplies become less available, it will become more difficult and costly for Bay Area water agencies to provide high quality water in the future. Accordingly, *the desire to improve the quality of water deliveries to M&I customers in the Bay Area will increase*.

## RELATED OPPORTUNITIES

The Delta is the largest estuary on the West Coast and provides essential habitat for a diverse array of fish and wildlife. A variety of factors have contributed to the decline of fish species in the Delta, including loss of habitat and water resources development, resulting in the listing of these species as threatened or endangered. Because the Delta is unlikely to return to known historic conditions, Delta fisheries recovery will depend on continued legal mandates and operational mechanisms to ensure success in the face of continually changing conditions. Several programs and practices to address Delta fisheries have been developed in response to ESA listings, the CVPIA, and other regulatory requirements. Legislation and water rights decisions, which include CVPIA (b)(2), SWQCB D-1641, VAMP, and EWA, allow project managers to meet and/or exceed regulatory requirements contained in the biological opinions.

Water deliveries from the Delta have been curtailed in recent years to help protect threatened and endangered fish populations and their habitats. However, while pumping curtailments and other actions in the Delta have been beneficial to fish, they often have had adverse impacts on cities, farms, and businesses that depend on water supplies pumped from or through the Delta.

Consequently, the EWA was developed to provide water project operators with additional flexibility in meeting or exceeding fishery requirements in the Delta.

It is expected that, under without-project future conditions, CVP and SWP pumping at Banks and Tracy will increase to meet south-of-Delta demands, resulting in greater impacts to Delta fisheries and the potential for more frequent pumping curtailments. Consequently, it is also likely that the EWA or a similar program will continue to operate in the future to preserve important at-risk Delta fish resources, and to do so without adverse major curtailments of supplies to south-of-Delta and Bay Area urban and agricultural water users. Currently, the EWA relies primarily on water acquisitions and transfers to obtain targeted supplies. However, a great deal of uncertainty is associated with the future of the California water market in the face of ever-growing demands in the state. As discussed in **Chapter IX**, it is expected that major increases will occur in demands for urban and related water supplies in the future. These increases will result in extensive competition for limited supplies. Without developing new water sources, these supplies will need to be rediverted primarily from agricultural uses. It is believed that this, in turn, will drive up the cost of water on the open market available for the program. In addition, for an acquisitions-based program such as the EWA, the increasing cost of water likely will be compounded by future budget constraints.

Accordingly, *an opportunity exists to evaluate whether an expanded Los Vaqueros Reservoir, as part of a regional water resources project, could provide a less-costly and more reliable source of replacement water to the EWA or a similar long-term program.* In addition to the potential to provide a less-costly water supply, an expanded Los Vaqueros Reservoir could provide dedicated storage and conveyance capacity for EWA supplies, rather than relying on surplus storage space in reservoirs such as San Luis Reservoir (first to spill EWA supplies), or surplus pumping capacity at Banks and Tracy pumping plants to move EWA water south of the Delta. An expansion project could also provide the opportunity for the EWA to divert Delta supplies from new and more efficient screened intakes, further reducing impacts to Delta fisheries.